Wildlife Populations: Red Knot

Background

The red knot, *Calidris canutus*, is an attractive shorebird that is now a threatened species in New Jersey. It has a remarkable life cycle. After journeying from the southern tip of South America, the red knots arrive on the shore of Delaware Bay in May and gorge themselves on horseshoe crab eggs in preparation for the long flight to their Arctic breeding grounds. The red knot is one of six shorebird species where the majority of the western hemisphere's population uses the bay as a spring migratory stopover. The red knot, the largest and the stockiest of the breeds, arrives on the bay in its breeding plumage, which consists of a distinctive breast of brilliant, rusty red that extends up the neck and around the eyes. This red bleeds somewhat into the patterned black, brown, gray, and white coloration on its wings and back. The red knot has a short, straight, black bill. It passes through again in August on its journey back to wintering grounds in South America.

Red knots begin arriving on the Delaware Bay during the first week of May, and gradually an average of approximately 55,000 birds can be found at the bay by mid-May. Major concentrations are found at Reed's Beach, Villas, Norbury's Landing, Moore's Beach, and Fortescue, but they can also be found on the coastal marsh of the Cape May peninsula.

On the Delaware Bay, red knots depend primarily on horseshoe crab eggs and, therefore, frequently can be found in areas of dense horseshoe crab spawning, usually sandy beaches with gentle slopes and minimal wave action. When they arrive on the bay, red knots have little or none of the fat they accumulated while in South America. Many birds burn muscle to reach the bay, desperately gambling that sufficient resources exist at their destination. By the end of May, red knots reach an average weight of about 185 grams, often gaining 110 of those grams on the Delaware Bay.

Crabs dig into the sand to lay their eggs. However, red knots rely on eggs exposed when too many horseshoe crabs try to lay eggs in the same area. To create new nests, the crabs inadvertently dig up old nests and expose previously laid eggs. If crab numbers drop to a low density, then eggs remain unavailable to most shorebirds. Red knots have been observed feeding on mussel beds on the Atlantic Coast marsh, but as a food resource the mussels are quite inadequate.

With sufficient fat resources accumulated in the Delaware Bay, the birds leave by the beginning of June and arrive on the Canadian Arctic tundra by the second week of the month, often in wintry conditions and nearly 100 percent snow cover. After laying their eggs, the females incubate without access to food for the first week or two, relying once again on the fat accumulated in the Delaware Bay. Invertebrate prey is unavailable until the third or fourth week of June, when the eggs begin to hatch. Females begin migrating south to wintering areas by the end of July, followed by males and then by the first-year offspring. They arrive in the wintering areas beginning in October and through November.

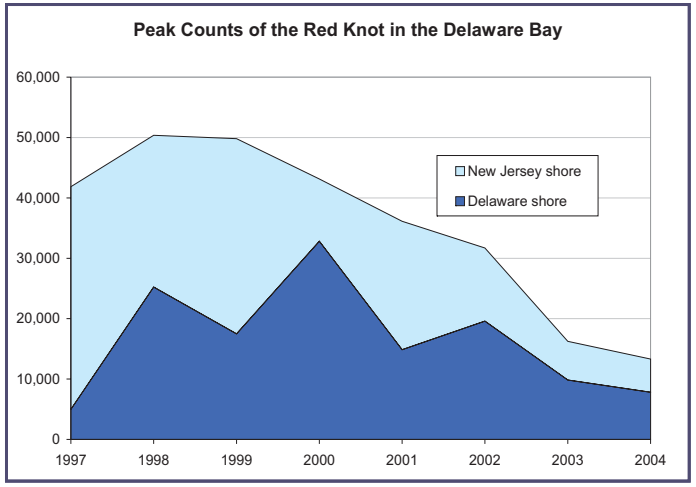
Trend

It is highly likely that the loss of horseshoe crab resources on the Delaware Bay during the last 10 years has caused the red knot population to decline. The complete failure of red knot spawning in 2003 led to a decline in the number of red knots that migrated to the bay, and in 2004 even fewer birds were observed at the bay, indicating a potential shift in the migration strategy of red knots and other shorebirds.

The red knot population has been declining relatively rapidly for the last seven years. (See Figure) In 2003, peak counts were half the usual number of red knots. In May 2004, the number of shorebirds on the Delaware Bay declined for the second year in a row to approximately 13,500, or 17 percent less than 2003. The decline of horseshoe crab populations has reduced spawning events to the full and new moon periods rather than the prolonged periods of spawning (late April to early June) that were normal 10 to 20 years ago. In 2003, there was no spawning until the first week of June, most red knots did not make threshold departure weights of 185 grams, and all birds delayed departure for arctic breeding grounds by a full week past the usual departure date of about May 28.

Outlook and Implications

In 2004, efforts to protect the red knot in the Delaware Bay were advanced by changes in regulations, which limit horseshoe crab harvests in four states to 150,000 crabs per year and restrict horseshoe crab harvests in May. With these restrictions, crabbers can harvest before and after May but not during. Horseshoe crab harvest is prohibited during May when birds are present and spawning activity is at its peak. Prohibiting harvest , both by trawl and by hand-harvest from beaches, lets the crabs migrate up into the bay and spawn a few times before returning back to the ocean. Before this prohibition, trawlers would harvest crabs concentrated at the mouth of the bay just prior to spawning, and hand-harvesters were selectively taking large females before they got a chance to spawn. This latter approach, apparently based on a belief (unsupported by data) that females make better bait, had the potential to drastically reduce the Horseshoe crab population. The regulations limiting the crab harvest were imposed individually by New Jersey, Delaware, Maryland and Virginia to meet harvest reductions required by the Atlantic States Marine Fish Commission. Regulations also prohibit recreational use during the last two weeks of May and the first week of June of beaches particularly important to shorebirds.



Delaware Bay projects to determine red knot population status include collection of key data for long-term model development, horseshoe crab egg counts, shorebird weight surveillance, individual markings of red knots for long-term survival analysis, and the monitoring bay-wide of the movements of the red knot in relation to crab egg densities using radio telemetry.

More Information

Visit New Jersey Department of Environmental Protection Division of Fish and Wildlife Web site at www.state.nj.us/dep/fgw/ensp/chile/index.html and www.nj.gov/dep/fgw/ensp/arctic2003/english/. Inquiries regarding red knot survey data should be directed to Kathy Clark, principal zoologist, Endangered & Nongame Species Program, Division of Fish and Wildlife, 500 E. State Street, P.O. Box 400, Trenton, NJ 08625-0400, (609) 292-9400 or (609) 628-2103, or Amanda Dey, senior biologist, Endangered & Nongame Species Program, Division of Fish and Wildlife, (609) 259-6962. For further information, visit the American Littoral Society at www.littoralsociety.org/red%20knots.htm or the New Jersey Audubon Society at www.njaudubon.org/Conservation/HScrabalert.html

References

The information in this report was provided by NJDEP Division of Fish and Wildlife staff and the following two Publications: Beans, B. E., and L. Niles, eds. 2003. Endangered and Threatened Wildlife of New Jersey. Rutgers University Press, New Brunswick, NJ and London and Niles, L. and A. Dey. 2004. Conservation of Red knots in the Western Hemisphere, Report to Wildlife Conservation Society.